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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/196,683 11/20/98 MIZUNO

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EXAMINER

IM52/0612

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CREPEAU, J

ART UNIT

PAPER NUMBER

1745

DATE MAILED:

06/12/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trad marks

Office Action Summary

Application No.

09/196,683

Applicant(s)

MIZUNO, SEIJI

Examiner

Jonathan S. Crepeau

Art Unit

1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 April 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 4-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 4-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

- 15) ☐ Notice of References Cited (PTO-892)
- 16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 18) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 19) ☐ Notice of Informal Patent Application (PTO-152)
- 20) ☐ Other:

DETAILED ACTION

Response to Amendment

1. This Office action is responsive to the CPA filed on April 3, 2001 and addresses claims 1 and 4-19. The claims remain rejected under 35 USC §103 for substantially the reasons of record. This action is non-final.

Claim Rejections - 35 USC § 103

2. Claims 8-11, 13-15, 18, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bloomfield et al (U.S. Pat. 5,989,741) in view of Salfelder et al (U.S. Pat. 5,636,098).

In column 8, lines 14-40, Bloomfield et al disclose a polymer electrolyte membrane and gas diffusion electrode assembly which is bonded to support frames with a layer of polyurethane adhesive. The support frames define anode and cathode compartments, and thus function as separators.

Bloomfield et al do not explicitly teach that the adhesive may be a mixture of epoxy resin and modified silicone, or that the adhesive has a modulus of elasticity of not greater than 10 MPa or a durometer A hardness of not greater than 90 after cure.

In column 8, lines 50-57, Salfelder et al teach that conventional adhesives are used to adhere two insulating layers together. Salfelder et al disclose that suitable adhesives include "acrylics such as methacrylate, polyesters, polyamides, polyurethanes, epoxies, silicone containing adhesives, and mixtures thereof".

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because as exemplified by the teaching of Salfelder et al, polyurethanes, epoxies, and silicones are all conventional materials for adhering two objects together. Therefore, the skilled artisan would be able to use equivalent materials to adhere the membrane electrode assembly of Bloomfield et al to the separators. Substitution of equivalents does not require express motivation as long as the prior art recognizes the equivalency (see *In re Fout*, 312 USPQ 532 (CCPA 1982)). Furthermore, the courts have held that it is *prima facie* obvious to combine two compositions, each of which is taught by the prior art to be useful for the same purpose (in this case, epoxy and silicone) in order to form a third composition which is to be used for the very same purpose (*In re Kerkhoven*, 205 USPQ 1069 (CCPA 1980)). Salfelder even hints that a silicone and epoxy combination is known by using the phrase "and mixtures thereof" after the disclosure of the adhesive species.

Regarding the hardness and modulus of elasticity of the claimed adhesive after cure, these properties would be expected to result upon combining the materials in the manner described above. Thus, these limitations are not considered to patentably distinguish over the references.

Response to Arguments

Applicant's arguments filed January 22, 2001 have been fully considered but they are not persuasive. Applicants argue that "none of the cited references, either alone or in combination, teaches or suggests the amended claims' approach to solving the problem of leaking fuel cells." However, it is noted that rationale different from Applicant's is permissible, and the prior art

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may have different reasons for doing what Applicant has done (see MPEP §2144, and *Ex parte Raychem Corp.*, 17 USPQ2d 1417, 1424 (BPAI 1990)). In any event, the Examiner maintains that the components of the claimed adhesive composition (e.g., silicone and epoxy resin) are both known individually in the prior art, and that these materials are functionally equivalent to polyurethane, which is a known fuel cell sealant. Therefore, upon using an epoxy/silicone mixture for the reasons set forth above, it may be reasonably expected that the properties of the mixture would fall within the claimed ranges. Previously, the Examiner alleged that these properties would be inherent, but it is acknowledged that this may not be the case since the properties are dependent upon the ratio of the components. Therefore, while the properties would not necessarily be *inherent* in the epoxy/silicone mixture, they still may be reasonably *expected* to be present. Accordingly, since the Bloomfield and Salfelder references lead the artisan to a fuel cell having an adhesive with a composition which would be expected to have the desired properties, the claimed subject matter is still not distinguished over these references.

Regarding the arguments that the claims are enabled by the specification, it is noted that the claims have not been rejected under 35 USC §112, first paragraph, and therefore, these arguments are not germane to the outstanding rejection under 35 USC §103.

3. Claims 1, 4-6 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bloomfield et al in view of Salfelder et al as applied to claims 8-11, 13-15, 18, and 19 above, and further in view of JP 9-199145.

The combination of Bloomfield et al and Salfelder et al do not explicitly teach that the polymer electrolyte has a molar water fraction of less than 4.

In the abstract, the Japanese reference teaches a fuel cell in which the edge of the polymer electrolyte is made hydrophobic before being bonded to the separators.

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the Japanese reference exemplifies that the practice of making the sealing portions of a polymer electrolyte membrane hydrophobic is well-known in the art. The artisan would thereby be motivated to make the sealing portions of Bloomfield's membrane hydrophobic in hopes of improving the sealability of the membrane with the separators. Additionally, the recitation of the molar fraction of water in the polymer electrolyte (i.e., a molar fraction of less than 4) is not considered to patentably distinguish over the references because the artisan would possess sufficient skill to optimize this water content during the process of making the edges of the membrane hydrophobic.

4. Claims 12 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bloomfield et al in view of Salfelder et al as applied to claims 8-11, 13-15, 18, and 19 above, and further in view of Tamura et al (U.S. Pat. 5,328,816).

The combination of Bloomfield et al and Salfelder et al do not explicitly teach that resin beads of a predetermined diameter are included in the adhesive.

In column 4, lines 45-53 Tamura et al teaches that two substrates are laminated together with an adhesive containing spacer beads of a uniform particle diameter.

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the disclosure of Tamura et al shows that using resin beads in an adhesive is a conventional method of keeping a uniform distance between two adhered substrates. The artisan would therefore be able to use this teaching as a way of keeping the thickness of the membrane/frame adhesion layer of Bloomfield et al at a predetermined value. Thus, this limitation is considered to be obvious to one of ordinary skill in the art.

5. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bloomfield et al in view of Salfelder et al in further view of JP 9-199145 as applied to claims 1, 4-6 and 17 above, and further in view of Tamura et al.

The combination of Bloomfield et al, Salfelder et al, and JP 9-199145 do not explicitly teach that resin beads of a predetermined diameter are included in the adhesive.

In column 4, lines 45-53 Tamura et al teaches that two substrates are laminated together with an adhesive containing spacer beads of a uniform particle diameter.

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the disclosure of Tamura et al shows that using resin beads in an adhesive is a conventional method of keeping a uniform distance between two adhered substrates. The artisan would therefore be able to use this teaching as a way of


keeping the thickness of the membrane/frame adhesion layer of Bloomfield et al or the Japanese reference at a predetermined value. Thus, this limitation is considered to be obvious to one of ordinary skill in the art.

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Crepeau whose telephone number is (703) 305-0051. The examiner can normally be reached Monday-Friday from 9:30 AM - 6:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gabrielle Brouillette, can be reached at (703) 308-0756. The phone number for the organization where this application or proceeding is assigned is (703) 305-5900. Additionally, documents may be faxed to (703) 305-3599.

Any inquiry of general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.


STEPHEN KALAFUT
PRIMARY EXAMINER
GRUP 1700

JSC

June 7, 2001